A CITIZEN'S GUIDE FOR WATERSHED PROTECTION

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REFERENCE: Proceedings of the 1997 Georgia Water Resources Conference, held March 20- 22, 1997, at The University of Georgia, Kathryn J. Hatcher, Editor, Institute of Ecology, The University of Georgia, Athens, Georgia.

Abstract. A forthcoming publication by the Georgia Environmental Organization [*GEO*] will guide watershed planning at a variety of scales ranging from individual properties at the small watershed level to interstate river basins. Using illustrations organized along watershed boundaries, *GEO*'s reference tool promotes a clearer perspective on the interrelatedness of our regional waterways. The guide, building on this knowledge, will show citizens how to take steps to improve water quality while at the same time improving the livability of their neighborhoods. Watershed planning is presented as an organizational paradigm that can result in more sustainable land use patterns.

DESCRIPTION OF THE GUIDE BOOK

As water becomes a limited and limiting resource for many communities in the Georgia Region, citizens from many walks of life seek to establish a new management paradigm that makes clean water available for use while protecting the environment in which they live. Community-based watershed planning constitutes a new organizational paradigm that seeks to harmonize goals for a healthy economy and a healthy environment. In order to meet the growing need for a reference that presents watershed concepts, GEO - Georgia Environmental Organization has developed *A Citizen's Guide to Watershed Planning* for the Georgia Region. The Guide will combine computer-generated illustrations with concepts for managing water resources in a more sustainable manner.

The Guide aims to assist groups and individuals in expressing concerns about water quality and watershed protection and management. It includes descriptions of the problems unique to various watersheds in Georgia, the federal and state statutes governing the use and protection of these areas (especially the Clean Water Act), resource information, a glossary of terms, suggestions for how citizens can participate in the environmental protection and pollution prevention process, organizing hints, and technical information regarding specific pollutants and environmental problems.

The book is organized around two pivotal images and two cycles. The two images are a generalized river basin running from the mountains to the sea and a neighborhood watershed that can run through anyone's backyard. The two cycles are the natural hydrocycle, its interrelationship with other natural systems, and the effects of the disruption of that cycle often caused by the other cycle, the imposed human water cycle, that forms an overlay to the natural one and seldom completes the loop to make it a genuine cycle.

The guide provides practical ideas for improved water quality and water conservation in and around the home, garden, farm, and small business. The simple techniques presented and their easy-to-follow illustrations will help one to grasp a fundamental understanding of such sciences as hydrology and geology.

The federal and state statutes will include, but not be limited to, the National Pollutant Discharge Elimination System [NPDES] permitting and enforcement program, the River Basin Management Act, Total Maximum Daily Load [TMDL] enforcement as it is being worked out in Georgia, the Water Quality Control Act, the Georgia Marshlands Protection Act, the Erosion and Sediment Control Act, the Clean Lakes Legislation, and Georgia Growth Strategies legislation. Rather than mere description and explanation, this section of the book will demonstrate how citizens can be an integral part of the decision-making process.

WATER ISSUES

During the last decade and a half, a series of events has focused attention on the need for improved water resource management. Droughts in the years of 1981, 1986, and 1988 led to severe water shortages. In 1994, Tropical Storm Alberto caused devastating floods and burst dams in the middle of Georgia. A year later more flooding followed as Tropical Storm Opal moved through the state.

Conflicts over water use have resulted in numerous lawsuits and enforcement actions. A suit between Alabama/Florida and Georgia, dubbed the Tri-State Water War, has been fought over the quantity of water (with some attention to quality) allocated from two river basins that represent finite natural resources.

Georgia's capital city of Atlanta currently pays fines of $20,000 a day to the state government for polluting the Chattahoochee River, and is experiencing a moratorium on new sewer hook-ups.

Another of the numerous legal challenges directed at improving water quality is a suit originated by *GEO* in 1994 against the United States Environmental Protection Agency for failure to ensure that the State of Georgia enforce the TMDL provisions of the Clean Water Act. In 1996, Federal Judge Marvin Shoob ruled in a summary judgment that: "*The*

undisputed facts show that Georgia has hundreds of heavily polluted waters that do not attain applicable water quality standards." The details of that decision are still being hammered out.

Citizens, frustrated by all this, are ready to become a part of the solution. The Guide will provide the basis for them to become involved.

After generations of dividing nature into ever smaller and usually unnatural parcels, taking for granted the ability of natural systems to supply us with renewable resources and absorb our wastes, we are now beginning to rethink our ways. The change is coming from citizen groups who find in watershed planning an organizing principle that allows them to form cooperative links with other communities and other organizations for the management of shared water resources along ecological boundaries. These watershed management districts are here termed EcoBasins to reflect their dual nature as physical drainage basins and ecological systems organized around one of nature's most limiting resources -- water.

RELATED WORK

Watershed planning has received increasing attention in the 1990's. A national conference, *Watershed '96*, held in Baltimore, Maryland, the latest in a series of bi-annual meetings on watersheds, drew an enthusiastic response from various groups that had previously met as adversaries. The resulting proceedings publication serves as a valuable reference but is directed toward a technical readership (Tetra Tech Inc., 1996). The US EPA has begun a series of books on watershed protection such as two published in 1995: *Watershed Protection: A Statewide Approach* and *Watershed Protection: A Project Focus*. Within Georgia, the Georgia EPD published in 1989 a citizen's guide for water quality, and recently the Georgia Conservancy held a series of well attended land use meetings called Blueprints for Better Communities. In the Atlanta Area, The Atlanta Regional Commission published, *Protecting Community Streams: A Guidebook for Local Governments*, that addresses a number of watershed issues (ARC, 1993) and a case study on watershed protection, *Community-based Urban Watershed Protection*, serves as a useful guide (Walker, 1996). The need remains, however, for a general guide using the watershed approach and aimed at empowering citizens to take leadership roles in watershed planning that is accessible to a wide audience. This publication is intended to serve that need.

PUBLICATION DESIGN

The core of the *GEO* publication will be a series of computer generated illustrations. These illustrations are being prepared by the Art Institute of Atlanta as a coordinated student project. Watersheds cover a range of sizes, with smaller watersheds nested inside larger ones like Russian dolls. The popular conception is that a watershed is a drainage basin surrounding a river. This view holds that water can be managed by protecting the source of the river in the mountains together with a narrow corridor of land along the river's channel. The Citizen's Guide will explode this illusion by emphasizing that river basins are formed by numerous sub-basins, each draining into a series of tributary streams that adds to the flow of the river. The quantity and quality of water in the river thus depends upon the health of its tributaries. The tributaries, in turn, form from small streams that originate as surface runoff and groundwater discharges throughout the basin. An organizing illustration used in the book will show a generalized river basin in three dimensions. The core view presents the physical and ecological features of the large-scale watershed including its connection to the ocean via coastal estuaries. These estuaries depend on an influx of clean fresh water from the rivers in order to maintain their bountiful production of seafood. The next illustration will be an overlay of the hydrological cycle that recycles water under the influence of solar energy. Within the base diagram will be numerous areas of human settlement. At the scale of the river basin illustration, these detail areas are seen as icons that refer to more explicit depictions. Each detailed illustration that is referred to represents a different land use that impacts water quality, such as a farm, a downtown, a suburban neighborhood, and a timber producing area. These small-scale, particularized illustrations emphasize that rivers begin in many locations throughout the landscape including one's own neighborhood.

Included in the detail views will be the water use and disposal infrastructure that is normally hidden from sight. For example, on the farm, irrigation wells that tap groundwater and contaminate it with leached chemicals can be brought into view. Within the city, plumbing systems for water supply, sewage disposal, and stormwater will be made visible. Accompanying illustrations will detail the operation of these systems.

In addition to highlighting our mismanagement of water resources, the *Citizen's Guide* presents a vision of a more sustainable alternative. By attaching dollar values to the operation of human water treatment systems and comparing them to the free services of nature, the benefits of ecological management and pollution prevention will be emphasized.

METHODS

The computer illustrations in our Citizen's Guide are drawn using Kinetix 3D Studio Max by Auto Desk. This three dimensional modeling program animates graphical images and transposes them between various types of media. Computer-based illus-tration was chosen for the project because of its flexibility in providing images for multiple media formats.

To succeed as a new organizational paradigm, community-based watershed planning will have to be marketed. Successful marketing requires that complex concepts be conveyed through images repeatedly presented using a variety of media. *GEO* plans a marketing strategy to promote the wide-scale use of watershed planning. Plans call for developing a number of informational

products as well as a series of broadcast public service announcements.

Once demand for watershed planning is generated through marketing, interactive educational tools will be produced. These tools will serve a variety of citizen groups. For example, to change from our current pattern of watershed-damaging, suburban sprawl, citizens from many walks of life need to learn how alternative development patterns can benefit them. Homeowners need to learn how to manage their yards to reduce waste, and when it comes time to buy a new home, learn how to recognize more environmentally-friendly designs. Developers need to learn how to design, finance, and build communities that are watershed-friendly. Prompted by demands from voters, politicians and public officials will need to respond by rewriting zoning and stormwater regulations that presently encourage sprawl and block environmentally sensitive designs.

To understand how a single illustration can be used for multiple media formats, consider the base diagram of a river basin. When converted to a CD-ROM format, the viewer will be able to click on various icons showing different aspects of the watershed. The first thing most viewers will want to do is zoom in on a neighborhood like their own. In the close-up view, the viewer will be able to change perspective and see features below the surface of the ground. This lets the viewer discover relationships between rainfall and the recharge of groundwater that feeds our streams and rivers. Different land management practices can have either beneficial or adverse consequences on water quality. Drainage systems that recharge ground water will lessen erosion, decrease surges of surface runoff that destroy stream habitat for clean-water organisms, and reduce pollution.

Watershed planning needs to extend from the river basin level to the individual home. The Clean Water Act has been very effective at reducing end-of-pipe industrial discharges but less effective at dealing with small sources of non-point pollution including stormwater runoff. A tremendous benefit would be realized if yards were landscaped so that runoff from rooftops were allowed to soak into the ground instead of being directed into storm sewers that empty directly into streams. Using the CD-ROM format, animated images can be developed to show citizens how various types of development alternatives will affect their corner of the watershed. As enforcement actions recently passed by the courts begin to be implemented, environ-mentally-friendly designs will become increasingly relevant to developers and homeowners.

A unique feature of the design of the *Citizen's Guide* is that it is designed to spin off multimedia educational tools. These tools--including posters, pamphlets, and videos--can empower citizens to make informed decisions about their own watershed and predict how these changes will impact neighbors downstream. By monitoring the health of their waterways and evaluating the results of local programs, this *GEO* initiated project can evolve so that it continues to meet current needs.

CONCLUSIONS

Together with a companion publication, *The Rio Directory and Atlas for the Georgia Region* that maps and presents data on 164 EcoBasins, *The Citizen's Guide* will provide concepts for managing water resources in a more sustainable manner. *GEO* will hold workshops throughout the region to train people how to use the two books to start their own watershed planning and to re-orient their lives from within an ecological framework.

ACKNOWLEDGMENTS

Much of the work related to the publication has been made possible by an early seed grant from the Turner Foundation. Tanya Floyd expanded the original draft of the book that was written by Danna Smith. Further conceptual, organizational, and research support was provided by Nita Patel from the Governor's Internship Program, and illustrations were developed by the Art Institute of Atlanta.